PROCEDURE FOR ENSURING THE OPERATION OF SIGNALLING CHANNELS IN A V5 INTERFACE

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FIELD OF THE INVENTION

The present invention relates to a procedure for ensuring the operation of protected signalling channels in a V5 interface between a local exchange and an access node in conjunction with a redefinition of the composition of the interface.

DESCRIPTION OF RELATED ART

Open interfaces (V5.1 and V5.2) between an access node and a local exchange are defined in the ETSI (European Telecommunications and Standards Institute) standards of the ETS 300 324 and ETS 300 347 series. V5 interfaces enable subscribers belonging to a physically separate local network to be connected to a telephone exchange using a standard interface. In the present application, V5 interface expressly refers to a dynamic concentrator interface (V5.2) as defined in the ETS 300 347 standard series, consisting of one or more (1–16) PCM (Pulse Code Modulation) cables. One PCM cable comprises 32 channels, each of which with a transfer rate of 64 kbit/s, i.e. 2048 kbit/s in all. The V5.2 interface supports analogue telephones as used in the public telephone network, digital, such as ISDN (Integrated Services Digital Network) basic and system subscriber connections as well as other analogue or digital terminal equipment based on semi-fixed connections.

Certain time slots in the V5 interface, which form a channel called C-channel, serve to transmit the protocols used for controlling the interface itself and the calls transmitted over the interface. A C-channel or a 64 kbit/s time slot reserved for this purpose serves to transmit information that may belong e.g. to the Control protocol, Link control protocol, Protection protocol or BCC protocol of the V5 interface, or which may consist of PSTN signalling or ISDN data. Further, according to the standards mentioned above, a C-channel can be reserved for time slots 16, 15 and/or 31 in the PCM line or V5 interface link. Especially in a V5.2 interface, the system automatically creates C-channels for the critical protocols (Control, Link control, BCC and Protection), whereas the operator can place the PSTN signalling as desired, either in the same channel with the critical protocols or in another C-channel. In addition, the operator may allocate a maximum of three signalling channels as so-called backup channels. These channels are resorted to in the case of a failure of the link to which the channels were originally allocated. In a V5.2 interface having more than one 2-Mbit/s link, a link whose physical C-channel in time slot 16 transmits the Control, Link control, BCC and Protection protocols is defined as the primary link. Further, a link whose physical C-channel in time slot 16 only transmits the Protection protocol is a secondary link.

The above-mentioned standards define two different ways of changing the data for a V5 interface already activated. Changing the data means e.g. that a signalling channel is transferred to another time slot or that additional signalling channels are introduced. Such changes can be effected using the so-called reprovision function defined in the standard, in which case the altered data are given a new "designation" (provision variant) at both ends, i.e. in the local exchange

and in the access node. The provision variant is a parameter which is checked in conjunction with the start-up of the V5 interface. This verification serves to ensure that both the local exchange and the access node observe the same composition in the V5 interface. Composition means in the first place the locations and order of the signalling channels. When the parameter in question is assigned a new value, this means that e.g. the signalling channels have a new location. When the changes are activated at both ends, i.e. when the interface is started up, the hardware first ensures via signalling that the new value of the "provision variant" is known at both ends, whereupon the changes of composition or configuration are made independently according to the parameter in question. However, it is also possible to make changes in the V5 interface without using the reprovision function. In this case, the changes are made independently at both ends without altering the value of the provision variant parameter. When the changes are activated, the defined changes are made automatically at both ends and the interface is started up.

The locations of the signalling channels in an active interface may change in consequence of a protection switch-over of a signalling channel. This creates a situation where the interface configuration is no longer consistent with the configuration originally defined by the operator. The problem is that the above-mentioned standards do not define whether the possible protection switch-over cases should be taken into account or not when a new configuration or composition is introduced. Further, when the composition of the interface is being defined, it must also be taken into account that one of the links may have been damaged and that consequently the signalling channels transmitted via that link are switched over to another link. FIGS. 1a and 1b present an example of such a situation. FIG. 1a illustrates normal operation between a local exchange LE and an access node AN. In this V5 interface, the signalling channel, which may be e.g. the BCC protocol, has been allocated to the topmost link in the V5 interface. Further, a backup channel has been allocated to the bottom most link in the interface. FIG. 1b illustrates an example situation where the backup channel and signalling channel are swapped, i.e. the signalling channel is switched over to the backup channel when the link is damaged.

SUMMARY OF THE INVENTION

The object of the present invention is to eliminate the problems described above. A specific object of the present invention is to present a new procedure that makes it possible to flexibly ensure the activation of the signalling channels in a V5 interface when a new composition is defined for the V5 interface without the reprovision function.

In the procedure of the invention, in a V5 interface between a local exchange and an access node, said interface comprising at least two links, to ensure the operation of the signalling channels in conjunction with a redefinition of the interface composition, in which redefinition changes are made in the V5 interface data, such as the placement of signalling channels on the links, according to the invention, the operation of protected channels is ensured in conjunction with restarting by activating the protected channels on the channels defined for them in the new composition and/or on the channels to which they were transferred in conjunction with the protection switch-over. The redefinition of the V5 interface composition is preferably carried out independently both in the local exchange and in the access node without changing the value of the interface composition parameter.